Population Forecasts: Long-Term Projections for Clark County, Nevada 2016-2050

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Prepared by

Center for Business and Economic Research
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Prepared for

Regional Transportation Commission of Southern Nevada, Southern Nevada Water Authority, Southern Nevada Regional Planning Coalition, and members of the Forecasting Group

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Executive Summary

Each year, the Regional Transportation Commission of Southern Nevada (RTC), the Southern Nevada Water Authority (SNWA), the Southern Nevada Regional Planning Coalition (SNRPC), the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas, and a group of community demographers and analysts work together to provide a long-term forecast of economic and demographic variables influencing Clark County's population growth. The primary goal is to develop a long-term forecast of the Clark County population that is consistent with the structural economic characteristics of the county. Toward this end, we employ a general-equilibrium demographic and economic model developed by Regional Economic Models, Inc. (REMI), specifically for Clark County.

The model recalibration incorporates the most recent available information regarding local employment growth, and local transit investment. The resulting long-term forecast predicts positive population growth throughout the range of the forecast. By 2035, we predict that Clark County's population will reach approximately 2.72 million. By 2050, we predict that it will reach nearly 2.83 million.

Table 1 summarizes the population forecast. This forecast shows a gradually declining growth rate of Clark County population over the forecast horizon. Despite short-term economic uncertainties and modeling difficulties, we note that this forecast is intended for medium- to long-term planning purposes. In the medium term, the population growth rate declines to 1.8 percent by 2020 as the Southern Nevada economy matures. In the long term, population growth tapers off as the maturing economy attracts fewer economic migrants. The rate of growth, which has been decidedly greater than the national average over the past fifty years, moderates and eventually moves below the

national rate of growth. By 2033, the population growth rate falls to 0.53 percent, slightly below the projected[1] long-term national population growth rate of 0.60 percent, as the Clark County economy continues to mature and falls further to 0.2 percent by 2050.

As is typical of any forecast, potential risks exist that could lead to either over- or underestimated population growth. Since currently the downside risk to U.S. economic growth exceeds the upside risk, the risk of overestimating population growth exceeds the risk of underestimation in the near term. The forecast began with the assumption that the local economy will continue to recover in 2016 and 2017. To the extent that the near-term economic outlook differs, the short-run forecasts will differ. Our long-term forecasts exclude business cycle, seasonal, and irregular events, which respond more to these short-run risks. We believe, however, that these risks tend to arise from short-term uncertainty; whereas, our forecasts are primarily meant to be long-term planning tools.

[1] Source: http://www.census.gov/population/projections/data/national/2014.html

Table 1: Clark County Final Population Forecast 2000 - 2050			
Year	**Population Forecast**	**Change in Population Forecast**	**Growth in Population (Percent)**
2000	1,428,689*		
2001	1,498,278*	69,589	4.9%
2002	1,578,332*	80,054	5.3%
2003	1,641,529*	63,197	4.0%
2004	1,747,025*	105,496	6.4%
2005	1,815,700*	68,675	3.9%
2006	1,912,654*	96,954	5.3%
2007	1,996,542*	83,888	4.4%
2008	1,986,145*	-10,397	-0.5%
2009	2,006,347*	20,202	1.0%
2010	1,951,269**	-55,078	-2.7%
2011	1,966,630*	15,361	0.8%
2012	2,008,654*	42,024	2.1%
2013	2,062,253*	53,599	2.7%
2014	2,102,238*	39,985	1.9%
2015	2,147,641*	45,403	2.2%
2016	2,193,000***	45,359	2.1%
2017	2,233,000	40,000	1.8%
2018	2,278,000	45,000	2.0%
2019	2,320,000	42,000	1.8%
2020	2,361,000	41,000	1.8%
2021	2,399,000	38,000	1.6%
2022	2,436,000	37,000	1.5%
2023	2,470,000	34,000	1.4%
2024	2,502,000	32,000	1.3%
2025	2,532,000	30,000	1.2%
2026	2,559,000	27,000	1.1%
2027	2,584,000	25,000	1.0%
2028	2,608,000	24,000	0.9%
2029	2,629,000	21,000	0.8%
2030	2,648,000	19,000	0.7%
2031	2,664,000	16,000	0.6%
2032	2,679,000	15,000	0.6%
2033	2,693,000	14,000	0.5%
2034	2,706,000	13,000	0.5%
2035	2,718,000	12,000	0.4%
2040	2,765,000	8,000	0.3%
2045	2,799,000	6,000	0.2%
2050	2,828,000	6,000	0.2%

* SNRPC consensus population estimate.
** 2010 U.S. Census.
*** CBER 2016 Economic Outlook forecast, December 2015.

Acknowledgements

CBER offers its thanks to the members of the Population Forecasting Group for comments on earlier versions of this report.

I. Introduction

Each year, the Regional Transportation Commission (RTC), the Southern Nevada Water Authority (SNWA), the Southern Nevada Regional Planning Coalition (SNRPC), the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas, and a group of community demographers and analysts work together to provide a long-term forecast of economic and demographic variables influencing Clark County. The primary goal is to develop a long-term forecast of the Clark County population that is consistent with the structural economic characteristics of the county. Toward this end, we employ a general-equilibrium demographic and economic model developed by Regional Economic Models, Inc. (REMI), specifically for Clark County.

The REMI model is a state-of-the-art econometric forecasting model that accounts for dynamic feedbacks between economic and demographic variables. Special features allow the user to update the model to include the most current economic information. CBER calibrates the model using information on recent local employment levels, the most recent national Gross Domestic Product (GDP) forecast, and spending on local capital projects.

The model employed divides Nevada into five regions: Clark County; Nye County; Lincoln County; Washoe County; and the remaining counties, which are combined to form a fifth region. These regions are modeled using the U.S. economy as a backdrop. The model contains over 100 economic and demographic relationships that are carefully constructed to represent concisely the Clark County economy. The model includes equations to account for migration and trade between Nevada counties and other states and counties in the country.

The demographic and economic data used to construct the model begin in 1990, the most important of which include the aggregate totals of employment, labor force, and population. The economic data for the most recent version of the model (REMI PI+ v1.7) are consistent with the North American Industry Classification System (NAICS). The REMI PI+ v1.7 model was released in 2015. Hence the model's most recent data are from 2013 because the Bureau of Labor Statistics (BLS) personal-income data are reported with a two-year lag. Over the years, the availability of the income data has been the key in setting the last year of history in the model.

The REMI model is the best model available for describing how economies interact geographically.[2] These interactions may take place within a single economy (such as the interaction between house-price growth and employment growth in Clark County) or between two economies (such as the interaction between Southern Nevada and Southern California). These and over 100 other interactions contained within the model are too complex to consider modeling on our own. Rather, we turn to the REMI model because it has a solid foundation in economic theory and the principles of general-equilibrium-based growth distribution, yet it still offers the flexibility required to model a regional economy like Clark County.

To guarantee that the model uses the most current data in the forecast, we make a series of adjustments to the model. In this way, we ensure that the forecast model includes the best available information when making the forecast. First, we update the model's national GDP forecast using the latest available national forecast from the University of Michigan's Research Seminar in Quantitative Economics (RSQE). Second, we rebase the population forecast to the most recent population estimate for Clark County

[2] See Schwer, R. K. and D. Rickman (1995), "A comparison of the multipliers of IMPLAN, REMI and RIMS II: Benchmarking ready-made models for comparison," *The Annals of Regional Science*.

available from SNRPC. Third, we update the model with current employment data from the Nevada Department of Employment, Training, and Rehabilitation (DETR). Fourth, we adjust future hotel employment based on the expected number of hotel rooms that will be added in the near future. Fifth, we include planned new investment in public infrastructure in the model using information from the RTC. Lastly, we incorporate the expected new employment generated by the Faraday Future project in Clark County.

In the following section, we first examine the changes in the REMI model from the prior year's model. Following that, Section III presents sequentially the changes we make to update the model and tailor it to local information. In Section IV, we report the population forecast and give a brief discussion of the economic environment surrounding the forecast. In Section V, we compare the population growth forecast with the previous years' forecasts. We conclude with a discussion of the risks to the forecast.

II. Comparison of REMI Models: Current and Previous Year

Based on our past practice, we start by comparing the most recent REMI out-of-the-box benchmark forecast prior to any model recalibrations, with the corresponding out-of-the-box forecasts from the prior REMI models. This gives us the opportunity to examine how the new model differs from previous versions and to explore the basis of these differences.

The most recent data used to develop this year's model are from 2013. Thus, we refer to the current model by its last historical year 2013 (LHY2013) and the previous model by its last historical year 2012 (LHY2012).

Each year, the REMI staff and users discuss the workings of the model and propose changes for improvement. The new REMI model, identified as PI+ v1.7, offers one major improvement; it includes the most recent data history for 2013 as well as a

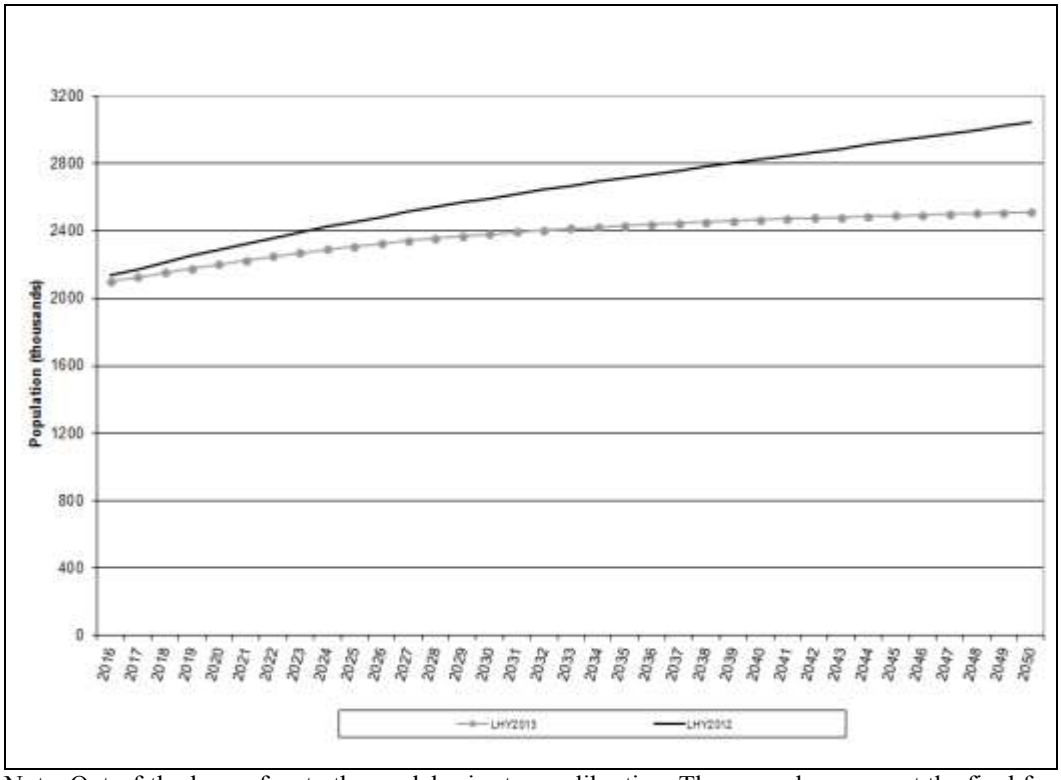
revision of historical data back to 1990. These updates lead to the differences in the out-of-the-box population forecast between the LHY2013 and LHY2012 models.

Figures 1 and 2 compare the LHY2013 and LHY2012 population forecasts from the out-of-the-box models (i.e., before any updating for employment, infrastructure projects, the national GDP forecast, and so on).[3] The out-of-the-box population forecast arising from the LHY2013 model predicts lower population levels for 2015 through 2050 than the LHY2012 model. With regards to population levels, the difference between the two forecasts starts relatively small in 2016 but grows monotonically larger over the entire forecast horizon. By 2050, the out-of-the-box forecasted population in the LHY2013 model is roughly 534,000 people below the LHY2012 model.

The forecasted population growth rates for LHY2012 and LHY2013 generally decline over the entire forecast horizon through 2050. The LHY2013 forecasted growth rate of population is about 0.5 percent below the growth rate of LHY2012. Thus, this comparison of the LHY2012 and LHY2013 forecasts of population and population growth rates illustrates how a small difference in growth rates accumulates to large differences in levels over time.

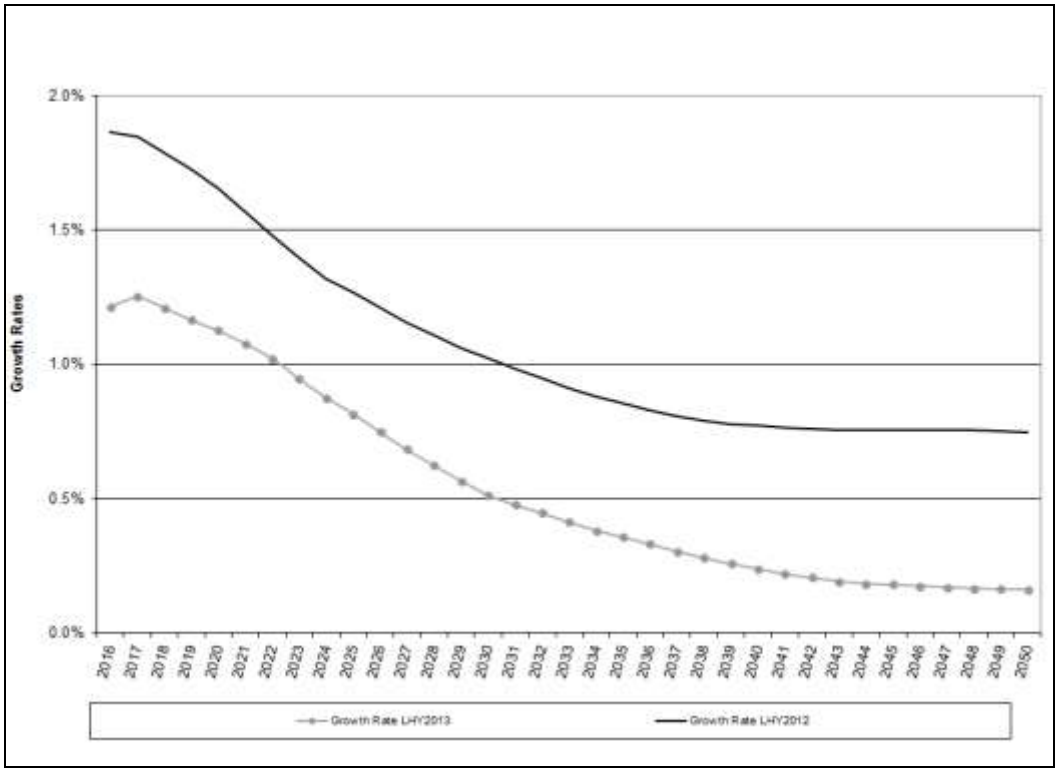
[3] The detailed out-of-the-box results through 2050 appear in Table A1 of the Appendix.

Figure 1: Clark County Population Forecasts: REMI Out-of-the-Box LHY2012 and LHY2013: 2016-2050



Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

Figure 2: Clark County Population-Growth-Rate Forecasts: REMI Out-of-the-Box LHY2012 and LHY2013: 2016-2050



Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

We can explain the lower out-of-the-box forecasted population levels from the LHY2013 model using the out-of-the-box economic and demographic forecasts. Table 2 shows a comparison of the REMI out-of-the-box economic and demographic forecasts from LHY2013 and LHY2012 for the years 2016 and 2050. The LHY2013 out-ot-the-box model predicts a weaker Clark County economy in 2016 and 2050, compared to the LHY2012, both in terms of total employment and GDP. In addition, the LHY2013 out-of-the-box model predicts a smaller Clark County economy as a percentage of the nation both in 2016 and in 2050 compared to the LHY2012 model. The weaker out-of-the-box Clark County economic foreacast from the LHY2013 model makes the region less attractive relative to the rest of the nation. This creates an outflow of economic migrants from Clark County beginning in 2016 and continuing through 2050. This pattern is evident from Table 2. The cumulative effect of the net loss of economic migrants in the LHY2013 out-of-the-box forecast leads to the lower foreasted population levels compared to the LHY2012 model. These dynamics also lead to a relatively older forecasted population in 2050 from the out-of-the-box LHY2013 model compared to the LHY2012 model. Finally, these positive or negative differences monotonically increase over the forecast horizon.

Table 2: Clark County REMI Out-of-the-Box Forecast Comparison, LHY2012 and LHY2013

	2016			2050		
	LHY2012	LHY2013	Change to forecast	LHY2012	LHY2013	Change to forecast
Population (Thousands)	2,135.18	2,100.15	-1.6%	3,045.66	2,511.21	-17.5%
Total employment (Thousands)	1,212.23	1,185.44	-2.2%	1,489.42	1,333.81	-10.4%
Total employment as a percent of nation	0.64	0.62	-2.5%	0.65	0.60	-8.4%
Gross domestic product (Billions of fixed 2009 dollars)	107.79	99.21	-8.0%	200.09	175.51	-12.3%
Gross domestic product as a percent of nation	0.62	0.58	-7.1%	0.61	0.54	-11.8%
Migrants (Thousands)						
Economic migrants	14.11	1.80	-87.3%	2.79	-6.18	-321.7%
Retired migrants	4.76	4.83	1.4%	7.45	7.82	5.0%
International migrants	7.10	7.52	5.9%	10.13	10.98	8.4%
Population by age (Thousands)						
Ages 0-14	424.23	410.75	-3.2%	537.71	388.05	-27.8%
Ages 15-24	264.46	258.72	-2.2%	329.38	250.98	-23.8%
Ages 25-64	1,138.06	1,123.48	-1.3%	1,459.42	1,192.98	-18.3%
Ages 64+	308.43	307.20	-0.4%	719.16	679.21	-5.6%

III. Recalibrating the Model

County-level personal income is only available with a two-year lag. As a result, the REMI model also has a two-year lag with the most recent historical data from 2013 for the current model, PI+ v1.7, released in 2015. To bring the model up to date, we update available pertinent model information, including the most recent national GDP forecast, more recent employment figures, and spending on capital projects to reflect local information in the forecast. We describe each update in turn.

In previous forecasts, we made an adjustment for disamenities related to population growth. This adjustment was appropriate during the years prior to the 2008 economic recession, as the Las Vegas metropolitan area was one of the fastest-growing

communities in the United States. Population growth rates, however, diminished in Clark County after the economic recession. As a result of this slower population growth, we removed the adjustment for disamenities related to population growth.

A. Adjustment of the national GDP forecast

The REMI model relies on a baseline national GDP forecast from the University of Michigan's Research Seminar in Quantitative Economics. The current REMI model, PI+ v1.7, utilizes the March 2015 GDP forecast from RSQE. We adjust the model's national GDP forecast using the March 2016 national GDP forecast from RSQE. Overall, we adjusted the national GDP components downward by about $500 billion in 2016 and $550 billion in 2017. The adjusted national forecast generates a new baseline forecast for Clark County. We then use the baseline forecast for the subsequent adjustments.

B. Rebasing the population forecast

We rebase the population forecasts using the population update feature in the REMI model. We update the population in 2015 based on the most recent information from the SNRPC. The SNRPC consensus population estimate for Clark County in 2015 is 2.15 million. In addition, we update the population levels in 2016 to reflect the population growth rate forecast from CBER's *2016 Economic Outlook*, which was published in December 2015. The latter adjustment incorporates the views of local economic experts at CBER in the short-term population forecasts. CBER predicts that the Clark County population will grow by 2.1 percent in 2016. These population growth-rate forecasts translate to a forecasted population of 2.19 million in 2016. We use these forecasted population levels to update the population in the REMI model.

C. Employment adjustment

An important update that we make to the REMI model is the employment adjustment. The industry-level employment data in REMI sum the BLS wage and salary estimates for Clark County and REMI's BLS-based estimate of the number of proprietors. The most recent historical year in the model's employment data is 2013. More recent wage and salary employment data are available, however, from the Nevada DETR for 2014 and 2015. Thus, we update the model to account for the more recent information.

The latest growth rates for the out-of-the-box REMI-model forecasts and recent DETR estimates are shown in Table 3 for 2014 and 2015. The actual growth rates from DETR differ noticeably from the REMI out-of-the-box forecasts, suggesting a clear need for adjustment. The employment update proceeds as follows. First, we calculate the annual percentage change using DETR data and apply the percentage changes to generate new estimates for 2014 and 2015. This procedure implicitly assumes that the proportion of self-employed in each industry classification grows at the same rate as does the ratio between full- and part-time workers.

Table 3: Employment Growth Rates for Clark County before Adjustment				
	REMI Baseline Forecast		DETR Estimates	
Industrial Classification	**2014**	**2015**	**2014**	**2015**
Construction	3.78%	5.88%	10.46%	12.11%
Air transportation	2.57%	2.47%	2.94%	1.90%
Rail transportation	2.25%	1.97%	3.51%	3.69%
Pipeline transportation	0.36%	0.93%	4.48%	2.14%
Monetary authorities, et al.	1.39%	1.42%	-4.29%	1.49%
Ins carriers, related activities	3.60%	2.60%	-0.41%	2.46%
Real estate	1.06%	1.47%	1.60%	5.76%
Professional, technical services	2.84%	2.33%	4.01%	3.31%
Management of companies	1.05%	0.65%	5.03%	9.58%
Administrative, support services	2.23%	2.35%	6.31%	8.35%
Ambulatory health care services	2.36%	2.57%	3.98%	4.71%
Hospitals	2.29%	2.91%	4.85%	7.51%
Amusement, gambling, and recreation	0.78%	1.40%	3.97%	6.11%
Accommodation	2.01%	2.34%	3.27%	-1.12%
Food services, drinking places	1.97%	2.25%	5.56%	5.26%
Total	1.74%	2.02%	3.17%	3.44%

Table 4 reports the updated employment data by category for the model. The Clark County job growth numbers in 2014 and 2015 suggest that general economic conditions continue to improve in the Las Vegas area. While the Southern Nevada economy gained 2.9 percent of its total employment in 2013, the DETR estimates suggest that Clark County employment grew by about 3.2 percent and 3.4 percent in 2014 and 2015, respectively. Most sectors of Southern Nevada's economy experienced positive job growth in 2014. The construction sector continues to experience strong positive job growth in 2014 as the sector continues to recover from the Great Recession. Strong employment gains also occurred in key sectors such as health care, gaming, accommodation, and food services. Overall, Southern Nevada's economy gained roughly 36,000 jobs in 2014.

Table 4: Model Job Adjustments (in 000s) for 2013 and 2014					
	Baseline	DETR Growth Rates		Adjusted Job Levels	
Industrial Classification	**History 2013**	**2014**	**2015**	**2014**	**2015**
Forestry et al.	0.25	0.41%	3.24%	0.25	0.26
Agriculture	0.03	4.00%	0.00%	0.03	0.03
Oil, gas extraction	1.39	1.87%	5.94%	1.41	1.50
Mining (except oil, gas)	1.62	2.59%	3.30%	1.67	1.72
Support activities for mining	0.07	6.94%	6.49%	0.08	0.08
Utilities	2.74	-1.17%	-1.29%	2.71	2.67
Construction	51.92	10.46%	12.11%	57.35	64.30
Wood product mfg	0.38	3.98%	4.34%	0.39	0.41
Nonmetallic mineral prod mfg	1.43	2.66%	4.10%	1.46	1.52
Primary metal mfg	0.75	0.54%	0.93%	0.75	0.76
Fabricated metal prod mfg	1.88	2.56%	2.60%	1.92	1.97
Machinery mfg	0.53	0.00%	-1.52%	0.53	0.52
Computer, electronic prod mfg	0.51	-2.16%	0.00%	0.50	0.50
Electrical equip, appliance mfg	0.55	-0.54%	0.73%	0.55	0.55
Motor vehicle mfg	0.16	1.86%	0.00%	0.16	0.16
Transp equip mfg exc motor veh	0.18	-0.54%	0.55%	0.18	0.18
Furniture, related prod mfg	0.80	3.50%	1.45%	0.83	0.84
Miscellaneous mfg	6.62	-2.18%	1.07%	6.47	6.54
Food mfg	3.17	0.63%	1.69%	3.19	3.25
Beverage, tobacco prod mfg	0.19	0.00%	2.69%	0.19	0.19
Textile mills; textile prod mills	0.55	1.82%	1.07%	0.56	0.57
Apparel mfg	0.36	-6.06%	-0.59%	0.34	0.34
Paper mfg	0.48	0.83%	1.23%	0.49	0.49
Printing, rel supp act	2.38	-0.04%	0.17%	2.37	2.38
Petroleum, coal prod mfg	0.05	0.00%	2.13%	0.05	0.05
Chemical mfg	1.03	1.46%	1.82%	1.04	1.06
Plastics, rubber prod mfg	1.60	1.25%	0.87%	1.62	1.63
Wholesale trade	24.63	2.94%	1.90%	25.36	25.84
Retail trade	117.69	3.51%	3.69%	121.82	126.31
Air transportation	6.14	1.82%	8.93%	6.25	6.81
Rail transportation	0.19	0.53%	0.53%	0.19	0.19
Water transportation	0.12	1.61%	1.59%	0.13	0.13
Truck transportation	4.56	2.24%	1.82%	4.66	4.75
Couriers and messengers	3.46	-0.26%	-0.46%	3.45	3.44
Transit, ground pass transp	14.82	4.48%	2.14%	15.49	15.82
Pipeline transportation	0.02	0.00%	0.00%	0.02	0.02
Scenic, sightseeing transp; supp	5.75	-0.24%	0.26%	5.74	5.75
Warehousing, storage	5.24	3.00%	2.69%	5.40	5.54

Table 4 Continued:	Baseline	DETR Growth Rates		Adjusted Job Levels	
Industrial Classification	**History 2013**	**2014**	**2015**	**2014**	**2015**
Publishing, exc Internet	2.54	-1.30%	-1.36%	2.51	2.47
Motion picture, sound rec	3.21	-0.34%	-0.34%	3.20	3.19
Internet serv, data proc, other	2.08	-1.44%	-2.15%	2.05	2.00
Broadcasting, exc Int;	1.68	1.19%	1.47%	1.70	1.72
Telecommunications	4.10	0.00%	-3.33%	4.10	3.96
Monetary authorities, et al.	20.69	-4.29%	1.49%	19.80	20.10
Sec, comm contracts, inv	31.20	-0.41%	2.46%	31.07	31.84
Ins carriers, rel act	12.73	-0.41%	2.46%	12.68	12.99
Real estate	68.79	1.60%	5.76%	69.89	73.92
Rental, leasing services	6.63	2.20%	2.38%	6.77	6.93
Prof, tech services	58.51	4.01%	3.31%	60.86	62.87
Mgmt of companies, enterprises	18.01	5.03%	9.58%	18.92	20.73
Administrative, support services	78.23	6.31%	8.35%	83.17	90.11
Waste mgmt, remed services	2.35	1.02%	1.43%	2.37	2.41
Educational services	9.88	2.48%	3.01%	10.12	10.43
Ambulatory health care services	38.99	3.98%	4.71%	40.54	42.45
Hospitals	17.85	4.85%	7.51%	18.71	20.12
Nursing, residential care facilities	8.70	2.12%	2.37%	8.88	9.09
Social assistance	17.90	3.93%	3.86%	18.60	19.32
Performing arts, spectator sports	21.07	1.06%	1.33%	21.30	21.58
Museums et al.	0.45	3.37%	3.26%	0.46	0.48
Amusement, gambling, recreation	14.34	3.97%	6.11%	14.91	15.82
Accommodation	163.57	3.27%	-1.12%	168.92	167.03
Food services, drinking places	91.09	5.56%	5.26%	96.15	101.21
Repair, maintenance	10.24	0.31%	0.79%	10.27	10.35
Personal, laundry services	27.41	0.82%	0.88%	27.63	27.88
Membership assoc, organ	8.53	2.11%	2.40%	8.71	8.92
Private households	5.94	0.56%	1.89%	5.97	6.08
State & local government	81.77	1.69%	1.21%	83.16	84.16
Federal civilian	12.52	-2.42%	-0.47%	12.21	12.16
Federal military	15.78	-3.02%	-2.24%	15.30	14.96
Farm	0.25	-2.80%	-2.88%	0.24	0.24
Total	1,121.20	3.17%	3.44%	1,156.74	1,196.56

The local economic recovery continued in 2015 with stronger employment growth. Strong positive job growth took place in 2015 in key sectors such as construction, real estate, administrative support, and gaming. Overall, Southern Nevada's economy gained roughly 40,000 jobs in 2015.

D. Hotel room adjustment

We make an adjustment to future hotel employment based on our expectation of the number of hotel rooms that will be added in the near future. The additional rooms and related employment represent properties that are either under construction with fixed opening dates, or properties that have development plans and a high probability that the projects will be completed during the specified year. In this way, we ensure that the model includes a good short-term forecast of new hotel investment and employment.

As of March 2016, the Las Vegas Convention and Visitors Authority (LVCVA) projects that an additional 234 hotel/motel rooms will be added to the local room stock by the end of 2016. This includes the opening of the Residence Inn South and the Thunderbird hotel. In 2017, the LVCVA projects an additional 873 hotel/motel rooms will get added to the inventory of hotel/motel rooms. This includes the All Net Resort and Arena, the Lucky Dragon Hotel and Casino, and Starwood Hotels and Resorts. Finally, hotel/motel room additions are expected to equal 5,338 in 2018, with the main additions of Resort World Las Vegas and Alon Las Vegas.

Table 5: Hotel Construction Adjustment

Year	Total Rooms	New Rooms	New Jobs Implied*	REMI Hotel Employment	REMI New Jobs Implied	Cumulative Additional Jobs After Hotel Adjustment
2015	149,213			170,750		
2016	149,447	234	374	173,817	3,067	3,067**
2017	150,320	873	1,397	176,999	3,182	6,249**
2018	155,658	5,338	8,541	178,308	1,309	11,723

* Assumes a jobs-to-room multiplier of 1.6.
** The new jobs implied by the room additions are less than the REMI hotel employment.

To estimate the new jobs generated by the new hotel/motel rooms, we assume a jobs-to-room multiplier of 1.6. We then use the jobs-to-room multiplier to generate the number of additional rooms and jobs *over and above* the rooms and jobs already included in the model. Table 5 reports the results, revealing an increase of about 11,723 jobs by 2018.

E. Transportation and infrastructure improvements

Clark County continues to invest in transportation infrastructure such as roads, highways, and mass transit. The REMI model assumes that public-infrastructure investment will follow a path consistent with the model history. Thus, some local spending on public infrastructure, such as road building and additional services, is built into the model. One-time monies, however, tend to come from outside the region (e.g., federal transportation funding). We need to incorporate these large, special projects in the forecast.

The estimated federal funding in transportation-infrastructure investment is about $273 million in 2016, $1.43 billion between 2017 and 2025, and $1.47 billion between 2026 and 2035.[4] We annualize these transportation-infrastructure expenditures and include them in the REMI model as new construction projects.

F. Faraday Future adjustment

Faraday Future is a planned auto manufacturing facility that will locate in Clark County. The project is expected to make significant capital investment and create many new jobs in the region. Projections forecast that the facility will generate direct construction expenditure of $612 million over 20 years. In addition, the operation of the company will create 300 jobs in 2016 with a total output of roughly $234 million.[5] By 2023, the total workforce of the company will reach 4,500 jobs with an annual output of nearly $3.5 billion. We annualize the new jobs created during the construction and operation phases

[4] Source: Regional Transportation Commission, March 2016.
[5] Source: Applied Economics (2015), *Economic Impact of Faraday Future on Clark County*.

of the Faraday Future project and include them in the REMI model as new construction and manufacturing jobs.

IV. Analysis of the Economic and Demographic Forecast

The forecast predicts moderate rates of population growth for Southern Nevada over the forecast period extending out to 2050. The rate of growth, which has been decidedly greater than the national average over the past fifty years, moderates and eventually moves below the national rate of growth. The economic forecast calls for the continuation of the economic recovery in 2016 and steady employment growth through 2018. Tables 6 through 8, respectively, report the population, employment, and GDP predictions for Clark County from the calibrated model.

A. Population

In the short term, the current forecast predicts moderate rates of population growth in Southern Nevada. The population in Clark County is predicted to grow at a rate of 2.1 percent in 2016 and 1.8 percent in 2017 (Table 6). The population growth rate declines in the medium term as the Clark County economy matures. By 2033, the population growth rate falls to 0.53 percent, slightly below the projected[6] long-term national population growth rate of 0.60 percent, as the Clark County economy continues to mature and falls further to 0.2 percent by 2050. This pattern of long-term growth conforms to a similar pattern seen in previous forecasts. The forecasted population growth of 0.2 percent in 2050 is roughly half the size of the projected long-term national population growth. This result reflects the cumulative losses of economic migrants that emerge in the long-term forecast after 2027. This loss emerges because Clark County becomes a less desirable economic destination in the long-term relative to the nation. We also stress that the

[6] Source: http://www.census.gov/population/projections/data/national/2014.html

forecasted growth rates beyond 2035 associate with significant uncertainty that may ultimately lead to higher or lower forecasts. We discuss the potential sources for these uncertainties in Section VI, which addresses the risks to the forecast.

Table 6: Population History, REMI Forecast, and Rebased Forecast[7]

Year	Population REMI Forecast*	Population Rebased Forecast	Change in Population Rebased Forecast	Growth in Population Rebased Forecast
2015	2,075,000	2,147,641**		
2016	2,100,000	2,193,000***	45,359	2.1%
2017	2,126,000	2,233,000	40,000	1.8%
2018	2,152,000	2,278,000	45,000	2.0%
2019	2,177,000	2,320,000	42,000	1.8%
2020	2,202,000	2,361,000	41,000	1.8%
2021	2,226,000	2,399,000	38,000	1.6%
2022	2,248,000	2,436,000	37,000	1.5%
2023	2,270,000	2,470,000	34,000	1.4%
2024	2,289,000	2,502,000	32,000	1.3%
2025	2,308,000	2,532,000	30,000	1.2%
2026	2,325,000	2,559,000	27,000	1.1%
2027	2,341,000	2,584,000	25,000	1.0%
2028	2,356,000	2,608,000	24,000	0.9%
2029	2,369,000	2,629,000	21,000	0.8%
2030	2,381,000	2,648,000	19,000	0.7%
2031	2,393,000	2,664,000	16,000	0.6%
2032	2,403,000	2,679,000	15,000	0.6%
2033	2,413,000	2,693,000	14,000	0.5%
2034	2,423,000	2,706,000	13,000	0.5%
2035	2,431,000	2,718,000	12,000	0.4%
2040	2,466,000	2,765,000	8,000	0.3%
2045	2,490,000	2,799,000	6,000	0.2%
2050	2,511,000	2,828,000	6,000	0.2%

* This forecast refers to the model prior to recalibration.
** Southern Nevada concensus population estimate.
*** CBER 2016 Economic Outlook forecast, December 2015.

We forecast that Clark County will add roughly 45,000 new residents in 2016. The forecast then predicts that population growth will remain strong in the near term as

[7] A table detailing the rebased population forecast appears in the Appendix – Table A2.

the local economy continues to experience strong employment gains as the economic recovery continues. Population growth, however, will not drive economic growth as it did throughout much of Las Vegas' history. Rather, economic growth will drive population growth in the next few years. The population forecast predicts that the Clark County population will increase to roughly 2.83 million by 2050.

B. Employment

The forecast predicts a steady economic recovery for Southern Nevada in 2016. We forecast that the Las Vegas economy will add an additional 32,000 jobs in 2016, which represents a 2.6 percent growth in employment over 2015. See Table 7.[8] We predict that employment growth will remain strong in 2017 as the economy is predicted to add 22,000 new jobs. The forecast also predicts a continuation of steady employment growth in the near term. By 2018, the forecast predicts that employment growth reaches a peak of 3.3 percent in 2018 and then eventually stabilizes at around 0.3 percent as the Southern Nevada economy matures.

[8] Unadjusted employment forecasts are shown in the Appendix.

Table 7: Employment History and Forecasts				
Year	Employment Forecast	Change in Employment Forecast	Growth in Employment Forecast	Employment-Population Ratio Forecast
2015	1,227,000*			0.57
2016	1,259,000	32,000	2.6%	0.57
2017	1,281,000	22,000	1.8%	0.57
2018	1,323,000	42,000	3.3%	0.58
2019	1,336,000	13,000	1.0%	0.58
2020	1,345,000	9,000	0.7%	0.57
2021	1,352,000	7,000	0.5%	0.56
2022	1,359,000	7,000	0.5%	0.56
2023	1,363,000	4,000	0.3%	0.55
2024	1,365,000	2,000	0.1%	0.55
2025	1,365,000	0	0.0%	0.54
2026	1,366,000	1,000	0.1%	0.53
2027	1,365,000	-1,000	-0.1%	0.53
2028	1,365,000	0	0.0%	0.52
2029	1,364,000	-1,000	-0.1%	0.52
2030	1,362,000	-2,000	-0.1%	0.51
2031	1,361,000	-1,000	-0.1%	0.51
2032	1,366,000	5,000	0.4%	0.51
2033	1,373,000	7,000	0.5%	0.51
2034	1,378,000	5,000	0.4%	0.51
2035	1,383,000	5,000	0.4%	0.51
2040	1,411,000	6,000	0.4%	0.51
2045	1,437,000	5,000	0.3%	0.51
2050	1,459,000	5,000	0.3%	0.52
* Actual employment.				

C. Gross domestic product

Gross Domestic Product (GDP) is defined as the dollar value of all final goods and services sold in a regional economy. As such, it reflects the output of a local economy and avoids double-counting initial and intermediate goods. The forecast for growth in Clark County GDP, shown in Table 8, basically mirrors the growth pattern of local employment. The GDP growth forecast starts at 4.5 percent in 2016, and climbs to 5.2

percent in 2018. The GDP growth forecast finally stabilizes at around 1.4 percent as the Southern Nevada economy reaches maturity.

Table 8: Gross Domestic Product Forecasts				
Year	GDP (Billions of Fixed 2016$) REMI Forecast	Change in GDP (Billions of Fixed 2016$) REMI Forecast	Growth in GDP (Billions of Fixed 2016$) REMI Forecast	GDP per Capita (Fixed 2016$) REMI Forecast
2016	118.11	5.08	4.5%	53,865
2017	122.43	4.32	3.7%	54,817
2018	128.74	6.31	5.2%	56,514
2019	132.39	3.65	2.8%	57,056
2020	135.74	3.35	2.5%	57,493
2021	138.94	3.20	2.4%	57,905
2022	142.07	3.13	2.3%	58,323
2023	145.2	3.13	2.2%	58,775
2024	148.04	2.83	2.0%	59,158
2025	150.74	2.70	1.8%	59,538
2026	153.64	2.91	1.9%	60,032
2027	156.25	2.61	1.7%	60,458
2028	158.98	2.73	1.7%	60,970
2029	161.75	2.77	1.7%	61,533
2030	164.44	2.69	1.7%	62,106
2031	165.9	1.46	0.9%	62,279
2032	168.13	2.23	1.3%	62,763
2033	170.56	2.43	1.4%	63,336
2034	172.93	2.37	1.4%	63,906
2035	175.13	2.20	1.3%	64,436
2040	187.29	2.53	1.4%	67,737
2045	200.54	2.67	1.4%	71,643
2050	214.56	2.88	1.4%	75,875

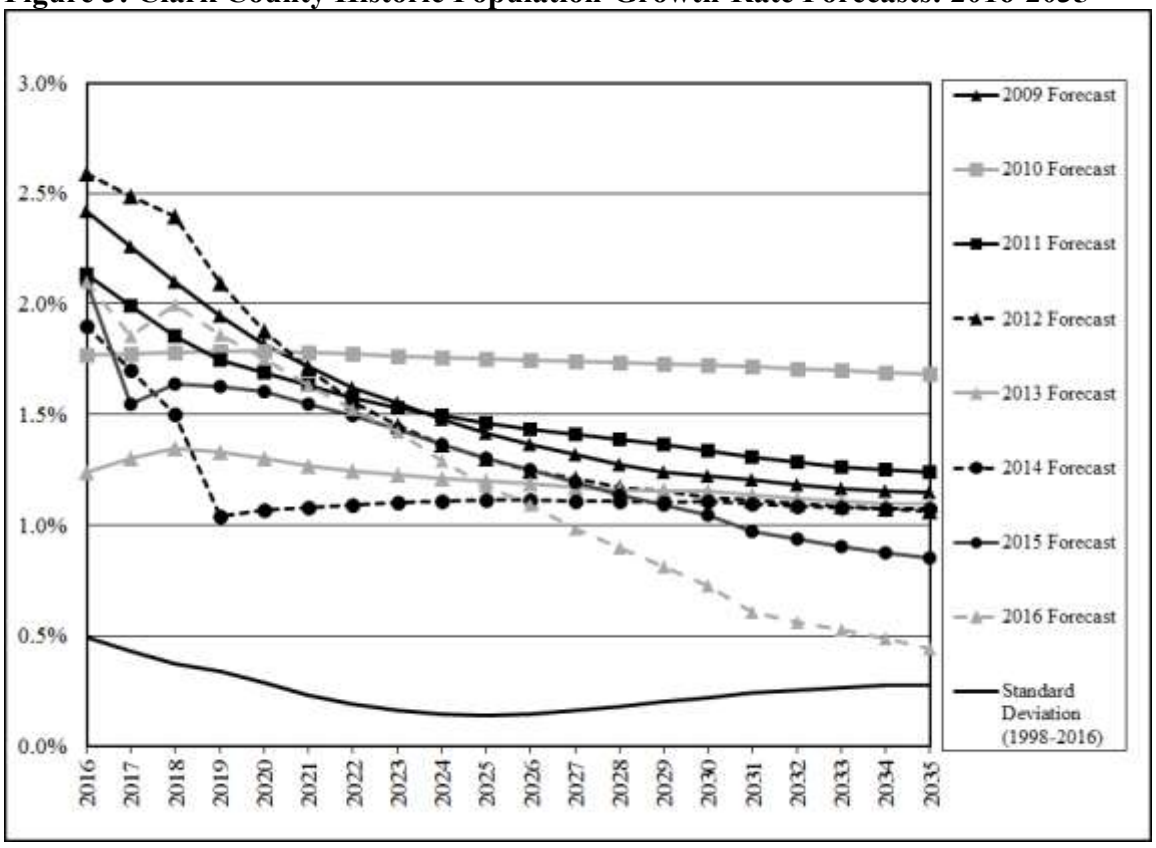
V. Comparing the Current Forecast with Forecasts of Previous Years

This section compares this year's final population growth forecasts with the final population growth forecasts from previous years. This exercise assesses the consistency of the forecast methodology and examines the variability in the population growth

forecasts over the last eight years. Figure 3 shows the population-growth-rate forecasts obtained from 2009 to 2016. Figure 3 also shows the standard deviation of the population-growth-rate forecast in the last 19 years (1998-2016).[9] The population-growth-rate forecasts exhibit a high level of variability in the near term. The standard deviation of the population-growth-rate forecast for the year 2016 is roughly 0.5 percent. This reflects a high degree of uncertainty in the short-term forecast (see Section VI). The variability among the population-growth-rate forecasts falls dramatically in the long term. By 2030, the average of the forecasted growth rates converges to about 1.3 percent, with a standard deviation of 0.3 percent. Hence, a large degree of consistency exists in the long-term growth predictions obtained during the last 19 years, as evidenced by the low standard deviation among the forecasts. This observation further confirms the fact that our forecasts are primarily meant to be long-run planning tools.

[9] The standard deviation is a measure of the variability among data points. For data that follow a normal distribution, 99.7 percent of data points will fall within approximately 3 standard deviations of the mean.

Figure 3: Clark County Historic Population-Growth-Rate Forecasts: 2016-2035



VI. Risks to the Forecast

Our Southern Nevada population forecasts rest on economic and demographic models embedded in the structural model for Clark County as produced by Regional Economic Models, Inc. (REMI). This structure provides long-term forecasts that exclude the noise that one finds in time-series data – that is, business cycle, seasonal, and irregular events. In addition, the uncertainty of the forecasts rises the further into the future that the forecasts extend. For example, forecasts of population growth for the next two years see a much smaller range over which the forecast may actually vary than the range for our forecasts 30 years into the future.

The main risks to the population forecasts arise from short-term fluctuations in both U.S. and Southern Nevada economic conditions. Based on our assessment of the

national and regional trends, we believe that the Southern Nevada economy will continue to see improvements in 2016 and 2017. In addition, we anticipate that the economic growth in the Southern Nevada economy will generally outperform the national economy, since we started our local recovery later and from a much deeper hole than faced at the national level. Nevertheless, the health of the Southern Nevada economy still depends on national and international economic activity.

The downside risk to U.S. economic growth exceeds, in our view, the upside risk in the near term. Forecasters lower their forecasts of real GDP growth with each new release. Moreover, similar downward revisions of growth rates also occur at the international level. If the Southern Nevada economy experiences slower growth because of weaker growth in the U.S. economy, this would result in lower population growth rates than those projected in the current forecast.

Economic growth in the rest of the world may also influence U.S. economic growth. For example, China became an important player in the world economy based on her aggregate size. The International Monetary Fund's (IMF) projection of economic growth in China falls with each new forecast release. Moreover, China purchases a large share of commodities on international markets, which are the major exports from many emerging market economies. Thus, slower growth in China leads to slower growth in emerging market economies. Once again, these events suggest that the downside risk for U.S. economic growth exceeds the upside risk.

The Federal Reserve System's (Fed) Board of Governors ended quantitative easing (QE) and instituted its first interest rate increase since the Great Recession of 25 basis points in December 2015. Currently, the Fed's thinking seems to lean toward two interest rate increases each in 2016 and 2017, which would leave the Federal funds rate in

the range of 1.25 to 1.5 percent at the end of 2017. But, the Fed's ultimate decision on the number of interest rate increases over the next two years will depend on what the data tell the Fed about the state of the U.S. economy. Fewer interest rate increases could lead to higher inflation, whereas more interest rate increases could lead to slower growth. At the international level, many other countries started QE much later than the U.S. and those policies continue. As a result, foreign central banks lower their interest rates as the Fed considers increasing U.S. rates. A widening interest rate differential will strengthen the dollar. And a stronger dollar means that our exports are more expensive and our imports are cheaper. Thus, the trade balance will deteriorate as exports fall and imports rise, tending to weaken U.S. economic growth.

Finally, a terrorist event in Southern Nevada, say on the "Strip," could significantly lower future economic growth and, thus, the population forecast. Visitor volume and net immigration to Southern Nevada would fall. The fall in visitor volume would also quickly slow economic growth in Southern Nevada.

In sum, although we feel the population forecasts are sound, risks exist that could lead to either over- or underestimated population growth. Since the downside risk to U.S. economic growth exceeds the upside risk, the risk of overestimating population growth exceeds the risk of underestimation in the near term. We reiterate that our long-term forecasts exclude business cycle, seasonal, and irregular events, which respond more to these short-run risks. Our long-term forecasts are designed to aid in the process of long-term planning.

VII. Conclusion

The latest REMI model projects long-term population growth patterns that are consistent with previous population forecasts. In the short term, the population forecast mirrors last year's forecast. In the medium term, the population forecast is higher than last year's forecast. By 2030, the population forecast falls below last year's forecast. These patterns reflect the new data incorporated into the model that accommodate the recent recovery from the Great Recession. We note that, despite short-term economic uncertainties and model difficulties, the long-term population forecast, which is the main focus of this forecasting exercise, remains consistent with past forecasts. By 2035, we predict that Clark County's population will reach about 2.72 million. In 2050, Clark County is expected to hit nearly 2.83 million residents.

Appendix:

Detailed Report Tables

Table A1: Out-of-the-Box Clark County Population and Population Growth Forecasts from REMI Models LHY2012 and LHY2013

Year	LHY2012 Population (Thousands)	LHY2013 Population (Thousands)	LHY2012 Population Growth	LHY2013 Population Growth
2016	2,135	2,100		
2017	2,175	2,126	1.8%	1.3%
2018	2,214	2,152	1.8%	1.2%
2019	2,252	2,177	1.7%	1.2%
2020	2,289	2,202	1.7%	1.1%
2021	2,325	2,226	1.6%	1.1%
2022	2,359	2,248	1.5%	1.0%
2023	2,392	2,270	1.4%	0.9%
2024	2,424	2,289	1.3%	0.9%
2025	2,455	2,308	1.3%	0.8%
2026	2,484	2,325	1.2%	0.7%
2027	2,513	2,341	1.2%	0.7%
2028	2,541	2,356	1.1%	0.6%
2029	2,568	2,369	1.1%	0.6%
2030	2,594	2,381	1.0%	0.5%
2031	2,619	2,393	1.0%	0.5%
2032	2,644	2,403	0.9%	0.4%
2033	2,668	2,413	0.9%	0.4%
2034	2,692	2,423	0.9%	0.4%
2035	2,715	2,431	0.9%	0.4%
2040	2,825	2,466	0.8%	0.2%
2045	2,933	2,490	0.8%	0.2%
2050	3,046	2,511	0.7%	0.2%

Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

Table A2: Detailed Final Population Forecast: 2000 – 2050			
Year	**Population Forecast**	**Change in Population Forecast**	**Growth in Population (Percent)**
2000	1,428,689*		
2001	1,498,278*	69,589	4.9%
2002	1,578,332*	80,054	5.3%
2003	1,641,529*	63,197	4.0%
2004	1,747,025*	105,496	6.4%
2005	1,815,700*	68,675	3.9%
2006	1,912,654*	96,954	5.3%
2007	1,996,542*	83,888	4.4%
2008	1,986,145*	-10,397	-0.5%
2009	2,006,347*	20,202	1.0%
2010	1,951,269**	-55,078	-2.7%
2011	1,966,630*	15,361	0.8%
2012	2,008,654*	42,024	2.1%
2013	2,062,253*	53,599	2.7%
2014	2,102,238*	39,985	2.0%
2015	2,147,641*	45,403	2.2%
2016	2,193,000***	45,359	2.1%
2017	2,233,000	40,000	1.8%
2018	2,278,000	45,000	2.0%
2019	2,320,000	42,000	1.8%
2020	2,361,000	41,000	1.8%
2021	2,399,000	38,000	1.6%
2022	2,436,000	37,000	1.5%
2023	2,470,000	34,000	1.4%
2024	2,502,000	32,000	1.3%
2025	2,532,000	30,000	1.2%
2026	2,559,000	27,000	1.1%
2027	2,584,000	25,000	1.0%
2028	2,608,000	24,000	0.9%
2029	2,629,000	21,000	0.8%
2030	2,648,000	19,000	0.7%
2031	2,664,000	16,000	0.6%
2032	2,679,000	15,000	0.6%
2033	2,693,000	14,000	0.5%
2034	2,706,000	13,000	0.5%
2035	2,718,000	12,000	0.4%
2036	2,729,000	11,000	0.4%
2037	2,739,000	10,000	0.4%
2038	2,748,000	9,000	0.3%
2039	2,757,000	9,000	0.3%
2040	2,765,000	8,000	0.3%
2041	2,773,000	8,000	0.3%
2042	2,780,000	7,000	0.3%
2043	2,786,000	6,000	0.2%
2044	2,793,000	7,000	0.3%
2045	2,799,000	6,000	0.2%
2046	2,805,000	6,000	0.2%
2047	2,811,000	6,000	0.2%
2048	2,817,000	6,000	0.2%
2049	2,822,000	5,000	0.2%
2050	2,828,000	6,000	0.2%

* SNRPC consensus population estimate.
** 2010 U.S. Census.
*** CBER 2016 Economic Outlook forecast, December 2015.
Note: The average annual forecasted growth rate is 0.8 percent.

Table A3: Economic Forecast										
Variable	**Unit**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Total Employment	Thousands (Jobs)	1258.851	1281.267	1323.009	1335.627	1345.154	1352.403	1358.694	1363.316	1364.582
Private Non-Farm Employment	Thousands (Jobs)	1146.885	1168.181	1208.121	1220.159	1229.384	1236.405	1242.584	1247.211	1248.638
Residence Adjusted Employment	Thousands	1212.533	1234.499	1275.433	1288.105	1297.825	1305.25	1311.681	1316.451	1317.951
Population	Thousands	2195.559	2233.453	2278.007	2320.328	2360.919	2399.395	2435.92	2470.466	2502.387
Labor Force	Thousands	1085.235	1100.505	1124.228	1144.597	1162.669	1178.384	1192.238	1208.543	1223.17
Gross Domestic Product	Billions of Fixed (2016) $	118.112	122.432	128.739	132.388	135.736	138.936	142.071	145.201	148.035
Output	Billions of Fixed (2016) $	187.35	194.337	204.712	210.658	215.501	220.144	224.531	229.26	233.567
Value Added	Billions of Fixed (2016) $	117.79	122.089	128.363	131.992	135.326	138.509	141.626	144.734	147.547
Personal Income	Billions of Fixed (2016) $	96.214	99.95	104.95	108.757	112.429	116.067	119.921	123.223	126.32
Disposable Personal Income	Billions of Fixed (2016) $	85.748	88.804	93.165	96.532	99.746	102.918	106.314	109.147	111.783
Real Disposable Personal Income	Billions of Fixed (2016) $	85.366	88.303	92.553	95.781	98.905	102.004	105.336	108.115	110.702
PCE-Price Index	2009=100 (Nation)	110.525	112.632	115.084	117.61	120.105	122.615	125.146	127.722	130.334

Table A3: Economic Forecast continued											
Variable	**Unit**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Total Employment	Thousands (Jobs)	1365.049	1366.301	1365.277	1364.649	1363.533	1361.914	1382.758	1411.113	1436.741	1458.668
Private Non-Farm Employment	Thousands (Jobs)	1249.283	1250.75	1250.09	1249.859	1249.134	1247.938	1272.185	1304.002	1332.733	1357.28
Residence Adjusted Employment	Thousands	1318.63	1320.06	1319.247	1318.776	1317.801	1316.314	1336.956	1364.87	1389.98	1411.321
Population	Thousands	2531.772	2559.35	2584.448	2607.558	2628.748	2647.79	2717.94	2765.016	2799.191	2827.779
Labor Force	Thousands	1235.398	1248.112	1259.589	1270.556	1280.803	1289.708	1321.633	1360.738	1400.024	1434.175
Gross Domestic Product	Billions of Fixed (2016) $	150.737	153.642	156.251	158.984	161.754	164.443	175.132	187.294	200.542	214.558
Output	Billions of Fixed (2016) $	237.584	241.815	245.471	249.475	253.419	257.095	272.472	290.452	310.003	330.593
Value Added	Billions of Fixed (2016) $	150.23	153.116	155.708	158.424	161.178	163.852	174.486	186.584	199.767	213.715
Personal Income	Billions of Fixed (2016) $	130.023	133.578	136.811	140.023	143.195	146.277	156.717	168.36	181.453	196.147
Disposable Personal Income	Billions of Fixed (2016) $	115.038	118.154	120.965	123.742	126.465	129.094	137.993	147.823	158.804	171.026
Real Disposable Personal Income	Billions of Fixed (2016) $	113.915	116.993	119.768	122.516	125.209	127.811	136.683	146.445	157.312	169.411
PCE-Price Index	2009=100 (Nation)	132.969	135.639	138.351	141.11	143.918	146.775	161.961	178.849	197.553	218.208

Table A4: Employment (in Thousands)									
Variable	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Private Non-Farm	1146.89	1168.18	1208.12	1220.16	1229.38	1236.41	1242.58	1247.21	1248.64
Forestry, Fishing, Other	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.31	0.31
Mining	3.49	3.57	3.68	3.72	3.72	3.74	3.76	3.78	3.82
Utilities	2.65	2.61	2.61	2.55	2.49	2.43	2.37	2.32	2.27
Construction	72.91	76.68	83.01	86.57	91.13	93.26	95.20	96.21	96.95
Manufacturing	24.73	25.03	25.89	26.32	25.59	25.32	25.06	25.02	24.66
Wholesale Trade	26.65	27.13	27.91	28.16	28.19	28.19	28.11	27.96	27.76
Retail Trade	129.51	131.85	135.75	136.97	137.70	138.14	138.24	137.94	137.42
Transportation and Warehousing	42.78	42.71	42.87	42.50	42.11	41.84	41.65	41.54	41.31
Information	13.27	13.12	13.14	12.91	12.68	12.46	12.24	12.01	11.76
Finance and Insurance	66.80	68.13	70.16	70.72	70.92	70.95	70.81	70.47	69.99
Real Estate and Rental and Leasing	88.13	89.38	91.21	91.70	92.06	92.47	92.88	93.26	93.43
Professional and Technical Services	64.71	65.87	67.93	68.77	69.55	70.38	71.26	72.20	72.96
Mngmt of Companies and Enterprises	20.93	20.98	21.33	21.18	20.89	20.63	20.38	20.13	19.85
Admin and Waste Services	98.60	100.43	103.62	104.62	105.41	106.21	106.97	107.70	108.20
Educational Services	10.78	11.06	11.44	11.63	11.78	11.90	12.00	12.07	12.09
Health Care and Social Assistance	95.75	98.33	101.93	103.89	105.71	107.58	109.47	111.38	112.96
Arts, Entertainment, and Recreation	38.51	38.85	39.49	39.51	39.50	39.54	39.61	39.69	39.68
Accommodation and Food Services	292.19	297.48	309.91	312.18	313.81	315.41	316.80	317.97	318.38
Other Services, except Govt	54.22	54.69	55.97	55.96	55.85	55.68	55.49	55.24	54.85
Government	111.74	112.86	114.67	115.25	115.56	115.79	115.91	115.91	115.75
State and Local	85.02	86.23	88.05	88.88	89.44	89.88	90.18	90.34	90.38
Federal Civilian	12.10	12.07	12.04	11.91	11.78	11.65	11.54	11.43	11.31
Federal Military	14.62	14.57	14.57	14.45	14.34	14.25	14.19	14.14	14.05
Farm	0.23	0.23	0.22	0.22	0.21	0.21	0.20	0.20	0.20

Table A4: Employment (in Thousands) continued										
Variable	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Private Non-Farm	1249.28	1250.75	1250.09	1249.86	1249.13	1247.94	1272.19	1304.00	1332.73	1357.28
Forestry, Fishing, Other	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.29	0.29
Mining	3.84	3.86	3.87	3.89	3.89	3.89	3.94	4.01	4.07	4.13
Utilities	2.21	2.16	2.11	2.05	2.00	1.94	1.71	1.51	1.32	1.15
Construction	97.65	98.63	99.35	100.21	101.17	102.22	111.28	120.92	130.35	138.65
Manufacturing	24.28	23.92	23.54	23.16	22.76	22.37	21.16	20.33	19.56	18.83
Wholesale Trade	27.56	27.37	27.15	26.94	26.72	26.50	26.04	25.65	25.12	24.43
Retail Trade	136.86	136.35	135.56	134.77	133.93	133.00	131.14	129.52	127.25	124.33
Transportation and Warehousing	41.10	40.95	40.78	40.65	40.54	40.45	41.29	42.58	43.86	45.15
Information	11.52	11.31	11.12	10.97	10.83	10.69	10.27	9.91	9.52	9.11
Finance and Insurance	69.50	69.08	68.54	68.05	67.57	67.06	66.29	65.78	65.04	64.06
Real Estate and Rental and Leasing	93.52	93.65	93.61	93.57	93.47	93.33	94.71	96.58	98.18	99.45
Professional and Technical Services	73.70	74.50	75.19	75.91	76.62	77.30	82.72	88.88	95.13	101.34
Mngmt of Companies and Enterprises	19.58	19.31	19.02	18.73	18.44	18.15	17.09	16.14	15.14	14.11
Admin and Waste Services	108.65	109.14	109.44	109.72	109.97	110.15	113.52	117.53	121.21	124.50
Educational Services	12.09	12.10	12.08	12.07	12.04	11.99	12.03	12.09	12.08	12.01
Health Care and Social Assistance	114.30	115.64	116.79	118.03	119.19	120.33	129.54	140.40	151.51	162.82
Arts, Entertainment, and Recreation	39.65	39.64	39.59	39.53	39.47	39.38	39.91	40.69	41.45	42.20
Accommodation and Food Services	318.55	318.75	318.38	318.01	317.33	316.37	317.13	319.24	320.06	319.65
Other Services, except Govt	54.42	54.07	53.66	53.28	52.90	52.52	52.12	51.95	51.61	51.09
Government	115.57	115.36	115.00	114.61	114.22	113.80	110.42	106.97	103.88	101.27
State and Local	90.39	90.34	90.15	89.89	89.63	89.33	86.69	83.96	81.50	79.45
Federal Civilian	11.21	11.12	11.03	10.95	10.89	10.84	10.64	10.50	10.37	10.25
Federal Military	13.97	13.90	13.82	13.76	13.70	13.64	13.09	12.52	12.01	11.57
Farm	0.19	0.19	0.19	0.18	0.18	0.18	0.16	0.14	0.13	0.12

Table A5: Gross Domestic Product (Billions of fixed 2016 $)*									
Variable	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Personal Consumption Expenditures	88.135	91.447	96.071	98.838	101.329	103.69	105.83	108.11	110.155
Motor vehicles and parts	3.011	3.144	3.35	3.476	3.582	3.681	3.77	3.852	3.936
Furnishings and durable household equipment	2.108	2.223	2.38	2.477	2.563	2.64	2.707	2.783	2.85
Recreational goods and other durable goods	4.824	5.228	5.74	6.089	6.391	6.642	6.835	7.06	7.261
Food and beverages	6.032	6.251	6.517	6.675	6.805	6.918	6.999	7.083	7.144
Clothing and footwear	2.585	2.669	2.799	2.87	2.935	2.998	3.056	3.099	3.169
Motor vehicle fuels, lubricants, and fluids	2.524	2.618	2.739	2.836	2.905	2.996	3.057	3.143	3.195
Fuel oil and other fuels	0.059	0.064	0.069	0.073	0.075	0.078	0.08	0.082	0.084
Other nondurable goods	7.076	7.362	7.772	8.031	8.267	8.513	8.739	9.001	9.232
Housing	14.648	14.948	15.394	15.615	15.85	16.101	16.365	16.638	16.873
Household utilities	1.819	1.847	1.89	1.913	1.937	1.959	1.984	2.005	2.031
Transportation services	2.74	2.836	2.986	3.052	3.105	3.145	3.173	3.209	3.232
Health care	16.366	17.016	17.881	18.453	18.999	19.552	20.109	20.716	21.306
Recreation and other services	24.344	25.24	26.557	27.278	27.914	28.468	28.955	29.439	29.843
Gross Private Domestic Fixed Investment	19.327	21.141	22.926	24.575	26.148	27.679	29.053	30.332	31.576
Residential	4.986	5.719	6.548	7.221	7.796	8.284	8.686	9.028	9.345
Nonresidential structures	4.07	4.478	5.021	5.44	5.759	5.982	6.122	6.209	6.282
Nonresidential equipment	13.121	13.708	14.435	15.133	15.847	16.634	17.485	18.426	19.375
Change in Private Inventories	0.132	0.15	0.152	0.155	0.151	0.152	0.155	0.153	0.15
Exogenous Final Demand	19.058	19.494	19.95	20.256	20.535	20.849	21.135	21.372	21.566
Government Consumption Expenditures	6.239	6.295	6.313	6.301	6.281	6.292	6.29	6.319	6.342
Federal Military	2.173	2.21	2.233	2.251	2.27	2.295	2.323	2.352	2.379
Federal Civilian	10.646	10.989	11.404	11.704	11.983	12.261	12.522	12.702	12.846
State and Local Government	64.768	66.848	70.725	72.559	73.7	74.948	76.183	77.897	79.297
Total Exports	76.842	80.223	85.136	88.305	90.587	92.901	94.906	97.462	99.69
Total Imports	88.135	91.447	96.071	98.838	101.329	103.69	105.83	108.11	110.155

* Note: The sum of the components may not add up to the total GDP due to rounding.

Table A5: Gross Domestic Product (Billions of fixed 2016 $) continued*										
Variable	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Personal Consumption Expenditures	112.026	114.083	115.824	117.704	119.608	121.434	128.325	136.222	144.833	154.009
Vehicle & parts	4.006	4.094	4.172	4.261	4.347	4.432	4.785	5.176	5.578	5.984
Computers & furniture	2.913	2.984	3.046	3.113	3.181	3.248	3.524	3.832	4.156	4.491
Other durables	7.455	7.665	7.854	8.057	8.269	8.477	9.379	10.431	11.566	12.763
Food & beverages	7.197	7.252	7.299	7.344	7.385	7.428	7.48	7.574	7.698	7.876
Clothing & shoes	3.229	3.289	3.339	3.389	3.438	3.481	3.65	3.842	4.04	4.246
Gasoline & oil	3.243	3.323	3.364	3.402	3.476	3.511	3.621	3.744	3.856	3.903
Fuel oil & coal	0.085	0.087	0.088	0.088	0.09	0.091	0.091	0.089	0.085	0.078
Other non-durables	9.461	9.709	9.934	10.184	10.431	10.681	11.759	13.005	14.385	15.89
Housing	17.082	17.303	17.482	17.668	17.849	18.016	18.478	18.982	19.541	20.167
Household operation	2.046	2.068	2.085	2.1	2.112	2.128	2.153	2.169	2.187	2.203
Transportation	3.251	3.277	3.295	3.317	3.341	3.363	3.427	3.523	3.638	3.768
Medical care	21.856	22.428	22.934	23.487	24.03	24.565	26.806	29.3	32.006	34.882
Other services	30.201	30.604	30.93	31.292	31.66	32.013	33.171	34.556	36.097	37.758
Gross Private Domestic Fixed Investment	32.812	34.097	35.38	36.723	38.115	39.569	46.616	54.612	63.196	72.166
Residential	9.648	9.974	10.296	10.64	11.01	11.393	13.356	15.672	18.094	20.473
Nonresidential structures	6.33	6.385	6.43	6.495	6.551	6.604	6.845	7.227	7.707	8.265
Nonresidential equipment	20.32	21.312	22.266	23.256	24.281	25.316	30.198	35.777	41.984	48.885
Change in Private Inventories	0.147	0.145	0.142	0.139	0.137	0.134	0.123	0.114	0.106	0.098
Exogenous Final Demand	21.735	21.909	22.013	22.101	22.179	22.254	22.283	22.351	22.459	22.724
Government Consumption Expenditures	6.354	6.376	6.376	6.375	6.36	6.359	6.241	6.19	6.145	6.148
Federal Military	2.403	2.429	2.449	2.47	2.491	2.51	2.571	2.644	2.723	2.819
Federal Civilian	12.977	13.104	13.188	13.256	13.328	13.385	13.471	13.517	13.59	13.757
State and Local Government	80.619	82.111	83.338	84.724	86.122	87.314	92.014	97.741	104.042	110.455
Total Exports	101.732	104.004	105.873	107.982	110.131	112.101	120.566	130.865	142.254	154.462
Total Imports	112.026	114.083	115.824	117.704	119.608	121.434	128.325	136.222	144.833	154.009

* Note: The sum of the components may not add up to the total GDP due to rounding.

Table A6: Income (Billions of fixed 2016 $)									
Variable	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Total earnings by place of work	69.015	71.664	75.862	78.376	80.736	82.89	84.947	87.019	88.87
Total wage and salary disbursements	50.712	52.842	56.059	57.979	59.743	61.367	62.921	64.494	65.895
Supplements to wages and salaries	11.057	11.355	11.965	12.372	12.771	13.15	13.509	13.879	14.211
Employer contributions for employee pension and insurance funds	7.454	7.624	8.05	8.329	8.597	8.853	9.105	9.36	9.592
Employer contributions for government social insurance	3.603	3.731	3.915	4.043	4.174	4.297	4.404	4.519	4.619
Proprietors' income with inventory valuation and capital consumption adjustments	7.227	7.434	7.792	7.973	8.169	8.323	8.48	8.618	8.742
Less: Contributions for government social insurance	7.46	7.754	8.153	8.415	8.677	8.921	9.132	9.356	9.548
Employee and self-employed contributions for government social insurance	3.857	4.023	4.238	4.372	4.503	4.624	4.727	4.837	4.93
Employer contributions for government social insurance	3.603	3.731	3.915	4.043	4.174	4.297	4.404	4.519	4.619
Plus: Adjustment for residence	-0.695	-0.726	-0.782	-0.806	-0.823	-0.837	-0.851	-0.865	-0.876
Gross in	0.955	0.982	1.008	1.032	1.058	1.084	1.112	1.139	1.167
Gross out	1.65	1.708	1.79	1.838	1.881	1.921	1.963	2.005	2.043
Equals: Net earnings by place of residence	61.746	64.027	67.763	69.974	72.049	73.967	75.863	77.744	79.428
Plus: Rental, personal interest, and personal dividend income	19.515	20.461	21.352	22.21	23.129	24.067	25.008	25.911	26.827
Plus: Personal current transfer receipts	6.522	6.911	7.278	7.636	8.024	8.424	8.832	9.228	9.635
Equals: Personal income	9.647	10.096	10.518	10.922	11.353	11.791	12.228	12.645	13.067
Less: Personal current taxes	3.346	3.454	3.557	3.652	3.752	3.852	3.948	4.037	4.125
Equals: Disposable personal income	14.952	15.462	15.835	16.574	17.25	18.033	19.05	19.568	20.066
Real personal income	96.214	99.95	104.95	108.757	112.429	116.067	119.921	123.223	126.32
Real disposable personal income	10.466	11.146	11.785	12.225	12.683	13.149	13.607	14.076	14.538
PCE-price index, 2009=100	85.748	88.804	93.165	96.532	99.746	102.918	106.314	109.147	111.783
Real personal income with housing price	96.635	100.081	104.901	108.39	111.867	115.338	119.044	122.214	125.19
Real disposable personal income with housing price	86.123	88.921	93.122	96.206	99.248	102.271	105.536	108.254	110.783
PCE-price index with housing price, 2009=100	109.553	111.849	114.382	117.091	119.691	122.296	124.908	127.558	130.24
Relative housing price	0.723	0.729	0.74	0.747	0.753	0.758	0.762	0.766	0.769

Table A6: Income (Billions of fixed 2016 $) continued										
Variable	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Total earnings by place of work	90.627	92.4	93.985	95.633	97.327	98.981	103.572	109.2	115.749	123.23
Total wage and salary disbursements	67.205	68.518	69.685	70.893	72.129	73.327	76.492	80.473	85.168	90.582
Supplements to wages and salaries	14.54	14.864	15.157	15.453	15.753	16.044	16.853	17.775	18.842	20.067
Employer contributions for employee pension and insurance funds	9.814	10.032	10.23	10.429	10.631	10.827	11.371	11.991	12.71	13.533
Employer contributions for government social insurance	4.726	4.832	4.927	5.024	5.122	5.217	5.481	5.783	6.133	6.533
Proprietors' income with inventory valuation and capital consumption adjustments	8.868	9.007	9.136	9.282	9.441	9.604	10.187	10.863	11.602	12.387
Less: Contributions for government social insurance	9.755	9.959	10.142	10.328	10.518	10.701	11.192	11.779	12.468	13.259
Employee and self-employed contributions for government social insurance	5.029	5.127	5.214	5.304	5.396	5.485	5.71	5.996	6.335	6.726
Employer contributions for government social insurance	4.726	4.832	4.927	5.024	5.122	5.217	5.481	5.783	6.133	6.533
Plus: Adjustment for residence	-0.885	-0.896	-0.904	-0.913	-0.925	-0.936	-0.972	-1.031	-1.108	-1.2
Gross in	1.194	1.22	1.245	1.271	1.297	1.323	1.404	1.49	1.589	1.705
Gross out	2.08	2.116	2.149	2.184	2.221	2.259	2.376	2.521	2.697	2.904
Equals: Net earnings by place of residence	81.005	82.581	83.987	85.444	86.935	88.39	92.278	97.064	102.659	109.032
Plus: Rental, personal interest, and personal dividend income	27.763	28.658	29.571	30.511	31.476	32.473	36.576	41.109	46.053	51.433
Plus: Personal current transfer receipts	10.054	10.461	10.879	11.313	11.761	12.228	14.226	16.502	19.063	21.935
Equals: Personal income	13.495	13.903	14.317	14.741	15.175	15.622	17.423	19.373	21.453	23.664
Less: Personal current taxes	4.213	4.294	4.375	4.457	4.54	4.624	4.926	5.233	5.537	5.835
Equals: Disposable personal income	21.256	22.339	23.253	24.069	24.784	25.413	27.864	30.187	32.74	35.682
Real personal income	130.023	133.578	136.811	140.023	143.195	146.277	156.717	168.36	181.453	196.147
Real disposable personal income	14.985	15.424	15.845	16.281	16.73	17.183	18.725	20.536	22.649	25.121
PCE-price index, 2009=100	115.038	118.154	120.965	123.742	126.465	129.094	137.993	147.823	158.804	171.026
Real personal income with housing price	128.793	132.264	135.411	138.561	141.673	144.701	155.125	166.775	179.87	194.589
Real disposable personal income with housing price	113.95	116.992	119.728	122.45	125.121	127.703	136.59	146.432	157.419	169.668
PCE-price index with housing price, 2009=100	132.928	135.641	138.398	141.186	144.02	146.9	162.071	178.865	197.42	217.878
Relative housing price	0.771	0.773	0.774	0.775	0.775	0.776	0.773	0.768	0.763	0.757

Table A7: Population and Labor Force (in Thousands)									
Variable	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Total population	2195.559	2233.453	2278.007	2320.328	2360.919	2399.395	2435.92	2470.466	2502.387
By race and ethnicity									
White	987.489	996.622	1008.504	1018.935	1028.218	1036.215	1043.018	1048.653	1052.845
Black	226.347	229.41	233.089	236.499	239.701	242.663	245.397	247.897	250.091
Other	299.723	305.872	312.97	319.808	326.453	332.856	339.035	344.984	350.605
Hispanic	682	701.55	723.444	745.087	766.548	787.661	808.469	828.932	848.846
By age									
Ages 0-14	429.545	434.195	440.349	445.56	450.595	454.838	457.847	460.487	463.653
Ages 15-24	270.739	272.68	277.185	281.618	283.346	286.523	290.386	293.752	295.457
Ages 25-64	1174.53	1190.495	1208.952	1225.631	1243.163	1258.178	1271.991	1284.733	1296.271
Ages 65 & older	320.745	336.083	351.521	367.52	383.815	399.856	415.696	431.494	447.006
Labor force	1085.235	1100.505	1124.228	1144.597	1162.669	1178.384	1192.238	1208.543	1223.17
Labor force participation rate	0.632	0.628	0.628	0.627	0.625	0.622	0.619	0.617	0.615
Participation rates by gender									
Male (16 & older)	0.697	0.693	0.693	0.692	0.689	0.686	0.683	0.682	0.68
Female (16 & older)	0.568	0.565	0.565	0.564	0.562	0.559	0.556	0.554	0.552

Table A7: Population and Labor Force (in Thousands) continued										
Variable	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Total population	2531.772	2559.35	2584.448	2607.558	2628.748	2647.79	2717.94	2765.016	2799.191	2827.779
By race and ethnicity										
White	1055.692	1057.542	1058.125	1057.683	1056.272	1053.868	1030.115	995.191	954.22	912.07
Black	251.986	253.653	255.031	256.174	257.085	257.756	258.327	256.165	252.259	247.233
Other	355.907	360.991	365.768	370.308	374.625	378.676	396.1	411.479	426.195	440.99
Hispanic	868.186	887.164	905.525	923.393	940.766	957.49	1033.397	1102.18	1166.517	1227.486
By age										
Ages 0-14	466.714	469.721	472.478	474.448	475.176	475.216	467.559	455.852	446.089	441.49
Ages 15-24	295.678	295.676	295.783	295.876	296.131	296.518	297.171	302.309	299.243	292.038
Ages 25-64	1306.113	1314.966	1322.163	1328.037	1333.225	1337.274	1352.378	1357	1364.071	1362.421
Ages 65 & older	463.267	478.988	494.024	509.197	524.216	538.782	600.833	649.856	689.788	731.829
Labor force	1235.398	1248.112	1259.589	1270.556	1280.803	1289.708	1321.633	1360.738	1400.024	1434.175
Labor force participation rate	0.613	0.612	0.611	0.61	0.609	0.608	0.601	0.602	0.608	0.613
Participation rates by gender										
Male (16 & older)	0.678	0.677	0.676	0.676	0.675	0.674	0.668	0.67	0.675	0.682
Female (16 & older)	0.55	0.549	0.547	0.546	0.545	0.544	0.536	0.538	0.542	0.547

Table A8: Demographics (in Thousands)									
Variable	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Starting population	2148.264	2195.559	2233.453	2278.007	2320.328	2360.919	2399.395	2435.92	2470.466
Births	11.657	11.446	11.304	11.163	10.963	10.691	10.328	9.904	9.434
Deaths	28.224	28.625	29.053	29.501	29.898	30.231	30.482	30.686	30.854
Natural growth	16.566	17.179	17.749	18.338	18.935	19.539	20.154	20.782	21.421
Population before migrants	2159.921	2207.005	2244.757	2289.17	2331.292	2371.611	2409.723	2445.824	2479.9
Total migrants	35.638	26.449	33.25	31.158	29.627	27.784	26.198	24.642	22.487
Economic migrants	23.867	13.811	20.123	17.824	15.878	13.576	11.564	9.585	7.093
Retired migrants	7.841	4.982	5.148	5.331	5.527	5.718	5.888	6.057	6.222
International migrants	4.497	7.747	7.975	8.199	8.419	8.636	8.86	9.083	9.315
Special pops migrants	-0.568	-0.091	0.003	-0.196	-0.196	-0.146	-0.115	-0.083	-0.143
Total population	2195.559	2233.453	2278.007	2320.328	2360.919	2399.395	2435.92	2470.466	2502.387

Table A8: Demographics (in Thousands) continued										
Variable	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
Starting population	2502.387	2531.772	2559.35	2584.448	2607.558	2628.748	2705.988	2756.951	2792.912	2822.286
Births	8.901	8.323	7.672	6.957	6.17	5.334	0.909	-2.734	-5.263	-6.948
Deaths	30.976	31.06	31.088	31.065	30.982	30.858	30.026	29.461	29.296	29.287
Natural growth	22.075	22.737	23.415	24.108	24.812	25.524	29.117	32.194	34.559	36.234
Population before migrants	2511.288	2540.095	2567.023	2591.405	2613.728	2634.082	2706.898	2754.217	2787.649	2815.339
Total migrants	20.484	19.256	17.426	16.153	15.02	13.707	11.043	10.798	11.542	12.44
Economic migrants	4.677	3.048	0.868	-0.78	-2.26	-3.7	-6.684	-7.175	-6.688	-6.21
Retired migrants	6.394	6.552	6.681	6.801	6.915	7.005	7.211	7.292	7.443	7.814
International migrants	9.547	9.778	10.008	10.237	10.465	10.513	10.718	10.865	10.952	10.977
Special pops migrants	-0.134	-0.123	-0.131	-0.106	-0.1	-0.11	-0.203	-0.184	-0.164	-0.141
Total population	2531.772	2559.35	2584.448	2607.558	2628.748	2647.79	2717.94	2765.016	2799.191	2827.779